RAKITOV, L. I., and PETROV, L. S.

"Conditions of Deposition of Oil and Principal Questions of the Exploration and Development of Oil Deposits in the Arctic," Prob. Arktiki, No. 3, pp. 98-109, 1940

Translation 563848

RAKITOVA, N. I.

"A Large Diverticulum of the Cervical Region and the Esophagus," Vest. Khirurgii, 69, No. 2, 1949.

RAKITYANSKAYA, O.F.

Action of some organic dyes on the F centers in alkali halide
crystals. Zhur. fiz. khim. 37 no.5:1167-1169 My '63.
(MIRA 17:1)

1. Odesskiy gosudarstvennyy universitet imeni I.I. Mechnikova.

TARASOV, V.S., dotsent; VAZHNOV, A.I., dotsent; MAKITSKIY, Yu.V., inzh.;
    POPOV, V.V., inzh.; SEMENOVA, L.N., inzh.

Method for conducting studies on dynamic stability with electronic
computers. Elektrichestvo no.4:7-12 Ap '60.   (MIRA 14:4)

1. Leningradskiy politekhnicheskiy institut imeni Kalinina.
            (Electric calculating machines)
        (Electric machinery—Electromechanical analogies)

C A

Composition and structure of ores from the Kopaonik Mine. Slobodan D. Rakitsch. *Glasnik Prirod. Muzeja Srpske Zemlje* (Bull. museum hist. nat. pays serbe), Ser. A 4, 161-236 1951 (German summary). – The southeastern part of the mine is rich in arsenopyrite. The ore contains pyrite, sphalerite, galena, tetrahedrite, and chalcopyrite with minor marcasite and covellite. Analyses of ores are given. Michel Fleischer

RAKITYANSKAYA, A.A.

Antigenic properties of the leukocytes in patients with leukemias. Probl.gemat.i perel.krovi no.6:22-27 '61.

(MIRA 14:10)

1. Iz Belorusskogo nauchno-issledovatel'skogo instituta perelivaniya krovi (dir. S.S. Kharamonenko).

(LEUKEMIA)

RAKITYANSKAYA, A. A., kand. med. nauk; ATRAKHOVICH, Z. N.

Protein composition of the blood serum in patients with leukemias.
Terap. arkh. no.7:91-95 '61.   (MIRA 15:2)

1. Iz Belorusskogo nauchno-issledovatel'skogo instituta pereli-
vaniya krovi (dir. S. S. Kharamonenko) i kafedry gospital'noy
terapii (zav. - prof. G. Kh. Dovgyalo) Minskogo meditsinskogo
instituta.

(LEUKEMIA)   (BLOOD PROTEINS)

DOVGYALLO, G.Kh., prof.; RAKITYANSKAYA, A.A.

Treatment of chronic leukemias.   Zdrav. Belor. 4 no.2:20-22 F '58.
(MIRA 13:8)
(LEUKEMIA)

RAKITYANSKAYA, A.A.

Grave posttransfusion complications. Zdrav. Bel. 7 no. 2:34-35
F '61.
                                                    (MIRA 14:2)

1. Belorusskiy nauchno-issledovatel'skiy perelivaniya krovi
(direktor S.S. Kharamonenko).
                            (BLOOD—TRANSFUSION)

RAKITYANSKAYA, A.A.

Republic conference on blood transfusion. Zdrav.Belor. 3
no.10:78-79 O '57.
(MIRA 13:6)
(BLOOD--TRANSFUSION)

DOVGYALLO, G.Kh., prof.; RAKITYANSKAYA, A.A., kand.med.nauk; ATRAKHOVICH, Z.N.

Myelosan treatment of chronic myeleukosis. Zdrav. Belor. 5 no.11:
9-11 N '59.   (MIRA 13:3)

1. Kafedra gospital'noy terapii Moskovskogo gosudarstvennogo medi-
tsinskogo instituta (MGMI) (zaveduyushchiy kafedroy - professor G.Kh.
Dovgyallo) i Belorusskiy nauchno-issledovatel'skiy institut pereli-
vaniya krovi (direktor S.S. Kharamonenko).
         (LEUKEMIA)   (METHANESULFONIC ACID)

RAKITYANSKAYA, A.A., KHARAMONENKO, S.S.

Group specificity and antigenic properties of leukocytes [with summary in English]. Probl.gemat. i perel. krovi. 3 no.4:50-53 Jl-Ag '58
(MIRA 11:8)

1. Iz Belorusskogo nauchno-issledovatel'skogo instituta perelivaniya krovi (dir. S.S. Kharamonenko).
(LEUKOCYTES.
group-specificity & antigenic properties of leukocytes
(Rus))
(BLOOD GROUPS.
group-specificity & antigenic properties of leukocytes
(Rus))

USSR / Human and Animal Physiology. Blood.

Abs Jour: Ref Zhur-Biol., No 9, 1958, 41187.

Author : Kharamonenka, S. S.; Rakitsyanskaya, A. A.
Inst   : AS BSSR
Title   : Bio-chemical Properties of Human Blood. Agglutino-
          gens and their physiological Role in the Organism.

Orig Pub: Izv. AN BSSR. Ser. biol. n. 1956, No 4, 153-162.

Abstract: The investigation of the biochemical and serologi-
          cal properties of O, A, B and AB agglutinogens (AG)
          of erythrocytes (E) and plasma of men demonstrated
          that the AG of E are phosphatides and the AG of
          plasma-polysaccharides. A physiological activity
          of materials obtained from E and plasma was demon-
          strated in experiments on dogs; their activity was
          particularly evident in combination with hetero-
          plasma. Isophosphatides in combination with hetero-

Card 1/2   47

USSR / Human and Animal Physiology. Blood.   T

Abs Jour: Ref Zhur-Biol., No 9, 1958, 41187.

Abstract: plasma favor the neutralization of the heterogenic properties of the plasma which is manifested by a marked decrease of post-transfusion reactions. The combination of isolated plasma-isopoly-saccharides with heteroplasma produces a sharp post-transfusion reaction. It is to be presumed that in such a combination a new, more-toxic protein poly-saccharide complex is formed conditioning the greater severity of the reaction. -- L. N. Dayneko.

Card 2/2

L 9906-63   EWP(j)/EWT(l)/EWP(q)/EWT(m)/BDS/EEC(b)-2—AFFTC/ASD/ESD-3—
Pc-4—RM/JD/MAY/IJP(C)   S/0076/63/037/005/1167/1169
ACCESSION NR: AP3000428

AUTHOR: Rakityanskaya, O. F.

TITLE: Action of some organic dyes on F-centers in alkali halide crystals

SOURCE: AN SSSR. Zhurnal fizicheskoy khimii, v. 37, no. 5, 1963, 1167-1169

TOPIC TAGS: F-bands, electron theory of chemisorption, Vol'kenshtein

ABSTRACT: Lowering the F-bands in spectrum of NaCl, KCl, and LiF crystals treated with dyes - methyl blue or erythrosin - was explained by the electron theory of chemisorption proposed by Vol'kenshtein (Elektronnaya teoriya kataliza na poluprobodnikakh, Fizmatgiz, M., 1960). Dye adsorption destroys the F-centers by pulling out the electrons necessary for formation of the chemisorptive bands. In crystals having larger electron bond energy in the F-centers, destruction from influence of adsorption is reduced. Behavior of long wave branching of the F-bands is apparently caused by adsorption of the dye itself. "I express deep gratitude to Professor E. A. Kirillov, a long-time friend, for guidance in work, valued counsel, and discussion of results." Orig. art. has: 4 figures.

ASSOCIATION: Odessa State University

Card 1/1

Il'yenkov, A.I.; ZHURAVEL', F.A.; RAKITYANSKIY, L.F.

Device for the automatic check of the parameter stability of
semiconductor devices. Trudy Inst. avtom. i elektrometr. SO
AN SSSR no.9:88-93 '64.   (MIRA 17:11)

OKHATSIMSKAYA, M., RASTRUSIN, Y., RAKITYANSKY, I., CHEPETNOV, R.

"Laws of excitation of short-period oscillations in middle latitudes."

report presented at the Intl. Association of Geomagnetism and Aeronomy, Symposium on Rapid Geomagnetic Variations, Utrecht, Netherlands, 1-4 Sep 59.

RAKITYANSKIY, N., starshina 1-oy stat'i, starshina komandy motoristov

If you know your business. Starsh.-serzh. no.7:30-31 Jl '62.

(MIRA 16:6)

(Submarine boats)

ALIYEV, F. S. ; RAKITYANSKIY, N. P.

Lithology and physicomechanical properties of bottom soils south
of Peschanyy Island. Dokl.AN Azerb. SSR 16 no.3:275-280 '60.
(MIRA 13:7)

1. Institut geologii AN AzerSSR. Predstavleno akademikom AN
AzerSSR Sh.F. Mekhtiyevym.
(Caspian Sea--Soil mechanics)

S/0076/64/038/004/1008/1010

ACCESSION NR: AP4034589

AUTHOR: Rakityanskaya, O. P.

TITLE: The mechanism of optical sensitization of alkali halide crystals

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 4, 1964, 1008-1010

TOPIC TAGS: optical sensitization, mechanism exciton, dye adsorption, organic dye, irradiation, F center, halide crystal

ABSTRACT: The adsorption of dye on a crystal leads to destruction of the existing F-centers. The liberated electrons proceed to form a strong chemisorption bond. The study of this phenomenon is of interest for some problems associated with the problems of the theory of optical sensitization. This experiment was directed toward the investigation of the effect of light on the process of destruction of F-centers observed previously in alkali halide crystals under the influence of absorption. The investigations were conducted with single crystals of artificial rock salt, potassium chloride and lithium fluoride in the form of plates with freshly cleaved sur-

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ACCESSION NR: AP4034589

faces. The time of irradiation of the preparations with x-rays
varied from 30 min. to 2 hours. The irradiated crystals were dyed
by bathing them in alcoholic solutions of organic dyes. The concen-
tration of dyes was $0.7 - 1.0 \cdot 10^{-4}$ g/ml. The maximum dying time was
6 min. The absorption spectra were measured on the quartz spectro-
photometer SF-4. The obtained experimental results support the con-
clusion already made about the electronic nature of chemisorption.
The experimentally observed destruction of the F-centers upon ir-
radiation of preparations in the absorption region of the sensitizer
leads to a conclusion that the most probable mechanism for optical
sensitization is the excitation mechanism. "In conclusion, the
author expresses his deep gratitude to Professor Ye. A. Kirillov,
Professor F. F. Vol'kenshteyn and Candidate of Physics and Mathe-
matics V. M. Fridkin for the continual interest in this work and
their valuable advice." Orig. art. has: 2 figures.

ASSOCIATION: Odesskiy gosudarstvennyy universitet im. I.I. Mechnikova
(Odessa State University)

SUBMITTED: 25May63
SUB CODE: OP, IC

Card 2/2

DATE ACQ: 20May64
NR REF SOV: 003

ENCL: 00
OTHER: 003

RAKITYANSKIY, P.

3591. RAKITYANSKIY, P. Opyt Peredovykh Sovkhozov Po Mekhanizatsii
Trudoemkikh Rabot V Zhivotnovodstve (Sbornikstansovkhozov SSSR. Glav.
Upr. s-kh. Propagandy) 25,000ekz Bespl.--(54-57346) P 636.0025

SO: Knizhnaya Letopis', Vol. 3, 1955

1. RAFITYANSKIY, . . P.

2. USSR (600)

4. Agricultural Machinery

7. Effectiveness of mechanization of heavy labor on livestock farms,
    Sov. zootekh, 7, No. 11, 1952.

9. **Monthly List of Russian Accessions**, Library of Congress, February 1953. Unclassified.

RASSADKIN, I. (Moskva); RAKITYANSKIY, V. (Moskva); YEROSHKIN, V. (Moskva);
     KONCHAYEV, B. (Leningrad); PARADA, V. (Uzbekskaya SSR);
     YADRENNIKOV, G. (Kurganskaya obl.); KRILOV, Ye., (Temir-Tau);
     PAN'KO (Krasnoyarsk); BALASHOV, V. (Komsomol'sk-na-Amure);
     PAVLENKO, S. (Rubtsovsk); TOKOYEV, N. (Kirgizskaya SSR);
     ANDRIYENKO, A. (Perm'); TEREKHOV (Tula); KAZAKOV, M. (Baku);
     TALBAYEV (Aktyubinskaya obl.); KOPTEVA, T. (Khar'kov); CHERKASHIN,
     I. (Izhevsk); BEZDETKO, V. (Alma-Ata); BURKOV (Kurganskaya obl.);
     KARPOV A. (Krasnodar); BOGDANOV (Ivanovo); SOZINOV, M. (Gor'kiy)

Is there a need for external fire escape stairs? Pozh.delo
8 no.7:26-27 Jl '62.   (MIRA 15:8)
                         (Fire escapes)

TSVETKOV, V.N., kand. tekhn. nauk, dotsent; RAKITYANSKIY, V.F., inzh.

Effect of the tanning method on the thickness of sole
leather in case of its wet processing. Nauch. trudy MTILP 25:
82-91 '62.   (MIRA 16:8)

RAKITYANSKIY, V.K.

Technological quality of sugar-beet varieties. V. K. Rakityanskit. *Sakharnaya Prom.* 28, No. 5, 31–0(1951).— In selecting a variety for sugar production, the processing qualities of beets should not be overlooked. Desirability does not depend entirely on sucrose content and wt. of beets per ha., but on the actual sugar yield. Certain nonsugars in beets have a tendency to increase molasses output.

V. E. Baikow

RAKITYANSKIY, V.K.

Technical characteristics of varieties of sugar beets. Sakh.proз.
28 no.5:34-36 '54.   (MLRA 7:9)

1. 2 Kubanskiy sakharnyy zavod.
   (Sugar beets--Varieties)

ACCESSION NR: AP4031175   S/0056/64/046/004/1476/1477

AUTHOR: Rakivcnko, Yu. N.; Skakun, Ye. A.; Yatsenko, G. I.; Klyucharev, A. P.

TITLE: Multipolarity of isomeric transition in the nucleus 58-Ce-138

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1476-1477

TOPIC TAGS: cerium, isomeric transition, multipolarity, decay scheme, conversion electron spectrum

ABSTRACT: The decay of the metastable state of the Ce^{138} nucleus, produced in the La^{139} (p, 2n)Ce^{138m} reaction when a lanthanum target is bombarded with protons at ∿ 20 MeV energy, was investigated with a magnetic β spectrometer. The electron detector was anthracene crystal 0.5 mm thick with a photomultiplier. The internal conversion electron spectrum yielded a value of 301 + 1 kV for the transition energy, in agreement with data by others. The ratio of the K and L internal conversion coefficients, 2.44 + 0.20, comes closest to the rated value for the E3 transition, 2.58. It is deduced that the isomer state has a spin value of 7 and negative parity, so that the 2.14 MeV level can be regarded as a two-particle excitation caused by the breakup by a neutron pair and the transition of one neutron from the $h_{11/2}$

Card 1/3

ACCESSION NR: AP4031175

state to the $d_{3/2}$ state. The decay scheme is deduced from the measurements. Orig. art. has: 2 figures.

ASSOCIATION: None

SUBMITTED: 20Jul63   DATE ACQ: 07May64   ENCL: 01
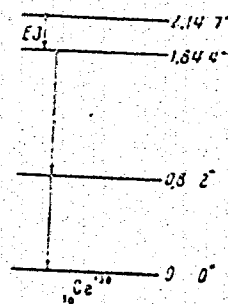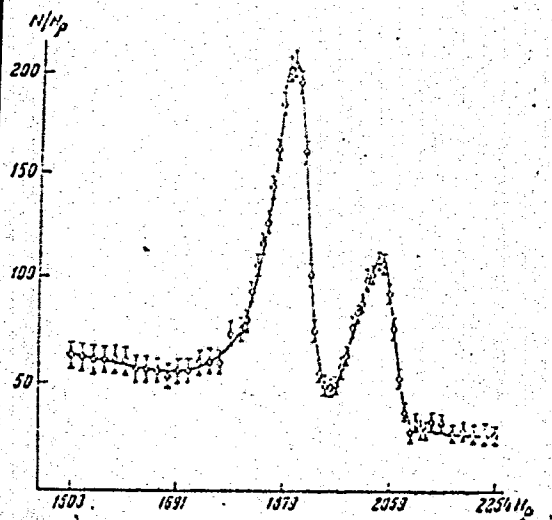
SUB CODE: NP   NR REF SOV: 001   OTHER: 001

Card 2/3

ACCESSION NR: AP4031175

ENCLOSURE: 01

Decay scheme of $_{58}Ce^{138m}$

Conversion electron spectrum of transition
$E_\gamma = 301$ keV

Card 3/3

GAJDEYEV, A.S.; GOVOROV, A.M.; OSETINSKIY, G.M.; RAKIVNENKO, A.N.; SIZOV, I.V.;
    SIKSIN, V.S.

    D--D reactions in the 100-1000 Kev deuteron energy range. Atom. energ.
    suppl. no.5:26-47 '57.   (MIRA 11:2)
            (Nuclear reactions)   (Deuterons)

SOV/124-58-11-13061

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 11, p 171 (USSR)

AUTHOR: Rakivnenko, N. S.

TITLE: On the Effect of Impact on Curved Beams. 1. Impact on a Circular
            Ring (K udaru po krivym brus'yam. 1. Udar po krugovomy kol'tsu)

PERIODICAL: Nauchn. soobshch. Khar'kovsk. in-t inzh. zh. -d. transp., 1957,
            Nr 2, 44 pp, ill.

ABSTRACT: The theory of impact on a circular ring is considered as one of
            the problems of the dynamics of curved beams. A direct, in-plane,
            central blow impinging on a ring is examined, with due considera-
            tion for the effects of local deformation, in the light of the assump-
            tion that the growth of local deformation is related in a linear
            fashion to the magnitude of the impression pressure (by an analogy
            with the "bedding coefficient" of beams supported by an elastic
            foundation). Differential relationships of the problems are presented
            in symbolic form together with a function representing the radial
            displacement of points on the axis of the ring under the action of the
            impact   By way of an example, the author examines an experiment
            performed by Tuzi and Nisida (Tuzi, Nisida, Scient. Papers Inst.

Card 1/2

On the Effect of Impact on Curved Beams.   1. Impact on a Circular Ring

SOV/124-58-11-13061

Phys. and Chem. Res. , Tokyo, 1928, Vol 9, Nr 149) wherein a phenolite ring was subjected to impact and the results were studied under polarized light. It is noted that the discrepancy between experimental and theoretical values of maximal stresses occurring in a ring during impact is very small. The solution of the problem is facilitated by graphs which reduce the problem to the summation of three members of a trigonometric series. The procedure described may be employed in dynamic analysis of arches, bridges, and ceiling elements, as well as chain links, lugs, etc.

A. F. Rozhnyatovskiy

Card 2/2

VINOGRADOV, A.I.; RAKIVNEMKO, N.S.

"Studies in the theory of structures" by A.A.Gvozdev and others. Reviewed by A.I.Vinogradov, N.S.Rakivnenko. Stroi. mekh.i rasch.soor. 2 no.3:51-52 '60. (MIRA 13:6)
(Structures, Theory of) (Gvozdev, A.A.)

RAKIVNENKO, N.S., kand.tekhn.nauk, dotsent

Spatial problem of the impact on a curved rod. Trudy KHIIT
no.45:3-27 '61.   (MIRA 15:5)
            (Elastic rods and wires)   (Arches)

RAKIVNENKO, N.S., kand.tekhn.nauk, dotsent

Effect of the impulse of a blast shock wave on a curved rod.
Trudy KHIIT no.45:28-35 '61.   (MIRA 15:5)
                (Elastic rods and wires)
                    (Blast effect)

RAKIVNENKO, N.S., kand.tekhn.nauk, dotsent

"Impact on a thin-walled rod." Nauch.trudy KHIIT no.53:5-21 '62.
(MIRA 16:12)

RAKIVNENKO, N.F. (Khar'kov)

"The circular three-dimensional problem of elastic impact on a thin-walled bar"

Report presented at the 2nd All-Union Congress on Theoretical and Applied
Mechanics, Moscow 29 Jan - 5 Feb 64.

25157

S/021/61/000/004/009/013
D213/D303

24 4200

AUTHORS: Rakivnenko, V.M., and Makhovykov, V.Yi.

TITLE: Concentration around a circular hole in a square plate

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR, Dopovidi, no. 4,
1961, 464 - 468

TEXT: This paper gives an analytical solution for the stress distribution of the load on the square and the hole. The following transformation function was obtained ·

$$\xi = \omega(\zeta) = \zeta\left[1 + \sum_{k=1}^{4} a_k \zeta^{4k} - \zeta^4\left(\frac{0,00815}{1 + 0,948\zeta^4} + \frac{0,0346}{1 + 0,550\zeta^4}\right)\right].\qquad(1)$$

Here $a_1 = -0.057$, $a_2 = -0.0143$, $a_3 = -0.0051$, $a_4 = 0.0016$. Function (1) describes a square for $\xi = \varepsilon = e^{i\theta}$, $/0 \leqslant \theta < 2\pi/$; and it describes very nearly a circle $\lambda\varepsilon$ for $\xi = \lambda\varepsilon$, i.e. $\omega(\lambda\varepsilon) = \lambda\varepsilon(1 + \Pi)$

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Concentration around a ...

The error Π is small, and for $\lambda = 1/\sqrt{3}$ it is less than 0.01165, and decreasing markedly with decreasing λi. The problem to be solved was represented by the plane boundary equations

$$\psi(\varepsilon) + \frac{\overline{\omega(\varepsilon)}}{\omega'(\varepsilon)}\,\varphi'(\varepsilon) + \chi_0\overline{\varphi(\varepsilon)} = \Phi_0(\theta), \quad \psi(\lambda\varepsilon) + \frac{\overline{\omega(\lambda\varepsilon)}}{\omega'(\lambda\varepsilon)}\,\varphi'(\lambda\varepsilon) + \chi_1\overline{\varphi(\lambda\varepsilon)} = \Phi_1(\theta). \tag{2}$$

Here $\varphi(\varsigma)$, $\psi(\varsigma)$ are required analytical functions in the annulus $\lambda < /\varsigma/ < 1$; χ_0, χ_1 are given constants; $\Phi_0(\theta)$, $\Phi_1(\theta)$ are given functions which can be expanded

$$\Phi_0(\theta) = \varepsilon\sum_{k=0}^{\infty}(b_k^0 e^{ik} + b_{-k}^0 e^{-ik}), \quad \Phi_1(\theta) = \varepsilon\sum_{k=0}^{\infty}(b_k^1 e^{ik} + b_{-k}^1 e^{-ik}). \tag{3}$$

b_k^0, b_{-k}^0, b_k^1, b_{-k}^1, being constants. Eq. (2) was solved by the method of V.I. Makhovikov (Ref. 2: Pribilizhennyye konformnye otobra-zheniya i ikh prilozheniya v teorii uprugosti (Approximate Confor-

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25157

Concentration around a ...

$S/021/61/000/004/009/013$
$D213/D303$

mal. Representations and their Application to the Strain Theory)
Diss., K., 1959) for the case:

$$\Phi_0(\theta) = p_0 \overline{\omega(\varepsilon)}, \quad \Phi_1(\theta) = p_1 \overline{\omega(\lambda\varepsilon)}, \quad \chi_0 = \chi_1 = 1$$

to give

$$\tau_0(\zeta) = c_0\zeta + \zeta\left[\sum_{k=1}^{2n} A_k\zeta^{4k} + \zeta^4\left(\frac{A_0}{1+0.948\zeta^4} + \frac{A_0'}{1+0.550\zeta^4} \right) \right] + \frac{p_0\omega(\zeta)}{1+\chi_0} =$$

$$= \sum_{k=0}^{\infty} C_k\zeta^{4k+1} + \frac{p_0\omega(\zeta)}{1+\chi_0}, \quad \varphi_1(\zeta) = \lambda \sum_{k=1}^{n} C_{-k}\left(\frac{\lambda}{\zeta} \right)^{4k-1} ; \tag{11}$$

$$\psi_0(\zeta) = \frac{1}{\zeta}\left\{ \sum_{k=0}^{2n}\left(B_k\zeta^{4k} + B_k'\zeta^{-4k} \right) \sum_{j=-2n+1}^{\infty} b_j\zeta^{4j} + c_1(\zeta^4 + 0.948)^{-1} + c_2(\zeta^4 + 0.550)^{-1} + \right.$$

$$\tag{11'}$$

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S/021/61/000/004/009/013
D213/D303

Concentration around a ...

$$+ \frac{1}{\omega'(\zeta)} \left[c_3 (\zeta^4 + 0,948)^{-1} + c_4 (\zeta^4 + 0,550)^{-1} + \left(\frac{c_5}{\zeta^4 + 0,948} + \right. \right.$$

$$\left. \left. + \frac{c_6}{\zeta^4 + 0,550} \right) \vec{r}_0(\zeta) + \left(1 + \sum_{k=1}^{4} a_k \zeta^{-4k} \right) \sum_{k=n+5}^{\cdot} (4k+) C_k \zeta^{4k} \right] \right\} =$$

$$\qquad (11).$$

$$= \sum_{k=0}^{\infty} C'_k \zeta^{4k-1}. \quad \psi_1(z) = \sum_{k=1}^{n} C'_{-k} \left(\frac{\lambda}{z} \right)^{4k+1},$$

where Λ_k, Λ_0, Λ_0^1, B_k^1, c_1, c_2, ..., c_6 are certain constants and b_k are the coefficients of expansion

$$\frac{1}{\omega'(\zeta)} = 1 + \sum_{k=1}^{\infty} b_k \zeta^{4k}$$

Card 4/7

25157

Concentration around a ...   S/021/61/000/004/009/013
                                      D213/D303

For real p_0 and p_1 constant pressure results of magnitude p_0 and p_1 on the square and the circular opening, respectively. Function (11) satisfies accurately the boundary equation for the square and very nearly for the circular opening. Table 1 gives the first few coefficients of the expansion of function (11) for the case $n = 4$,

$$\lambda = \frac{1}{\sqrt{3}}, \ \lambda = 0.625a, \ X_0 = X_1 = 1,$$

and p is $p_0 = p_1$. The stresses on the opening were calculated from the formula

$$\sigma_\theta = \sigma_i + 4Re[\varphi(\lambda\varepsilon)/\omega(\lambda\varepsilon)]$$

where $\sigma_p = p_1$. Table 2 gives the values of σ for certain positions on the opening (for $= 1/\sqrt{3}$). As the boundary equation for the square is satisfied exactly, the remainder error is zero, while for the opening the error is less than 0.025 p, which gives a sa-

Card 5/7

23157

S/021/61/000/00:/009/013
D213/D303

Concentration around a ...

tisfactory solution to the problem. There are 2 tables. 1 figure,
and 3 Soviet bloc references.

ASSOCIATION: Ukrayins'kyy zaochnyy politekhnichnyy instytut (Ukrai-
nian Polytechnic Institute)

PRESENTED: H.M. Savin, Member AS UkrSSR

SUBMITTED: June 17, 1960

Card 6/7

RAKIVNENKO, V.N. [Rakivnenko, V.M.]; MAKHOVIKOV, V.I.

Stress concentration around a circular hole in a square plate.
Dop. AN URSR no.4:464-468 '61.   (MIRA 14:6)

1. Ukrainskiy zaochnyy politekhnicheskiy institut. Predstavleno
akademikom AN USSR G.N. Savinym.
            (Elastic plates and shells)

OBODOVSKIY, Boris Arnol'dovich; KHANIN, Solomon Yefimovich;
    Prinimali uchastiye ORZHEKHOVSKAYA, O.P.; ITSKOVICH,
    G.M.; DARKOV, A.V., prof., doktor tekhn. nauk,
    retsenzent; KRYUKOVSKIY, S.S., prof., retsenzent
    [deceased]; KRYTOV, G.M., dots., retsenzent; RAKIVNENKO,
    V.N., st. prepod., retsenzent; VINOKUROV, A.I., otv. red.;
    VAYNBERG, D.A., red.

    [Strength of materials in examples and problems] Soprotiv-
    lenie materialov v primerakh i zadachakh. Khar'kov, Izd-
    vo Khar'kovskogo gos. univ., 1965. 314 p.   (MIRA 18:5)

RAKK, V.P.

Increase the number and improve the operation of filling stations.
Neftianik 7 no.9:9 S '62.   (MIRA 16:7)

1. Nachal'nik Kazanskogo upravleniya Glavnefteznaba.
            (Service stations)

ATLASHKIN, Yu.F.; RAKK, V.P.; BARSUK, I.M.

Replies to the article "Basic trends in the development of
tank farms" by A.G. Dubiaga and others, published in "Neftianoe
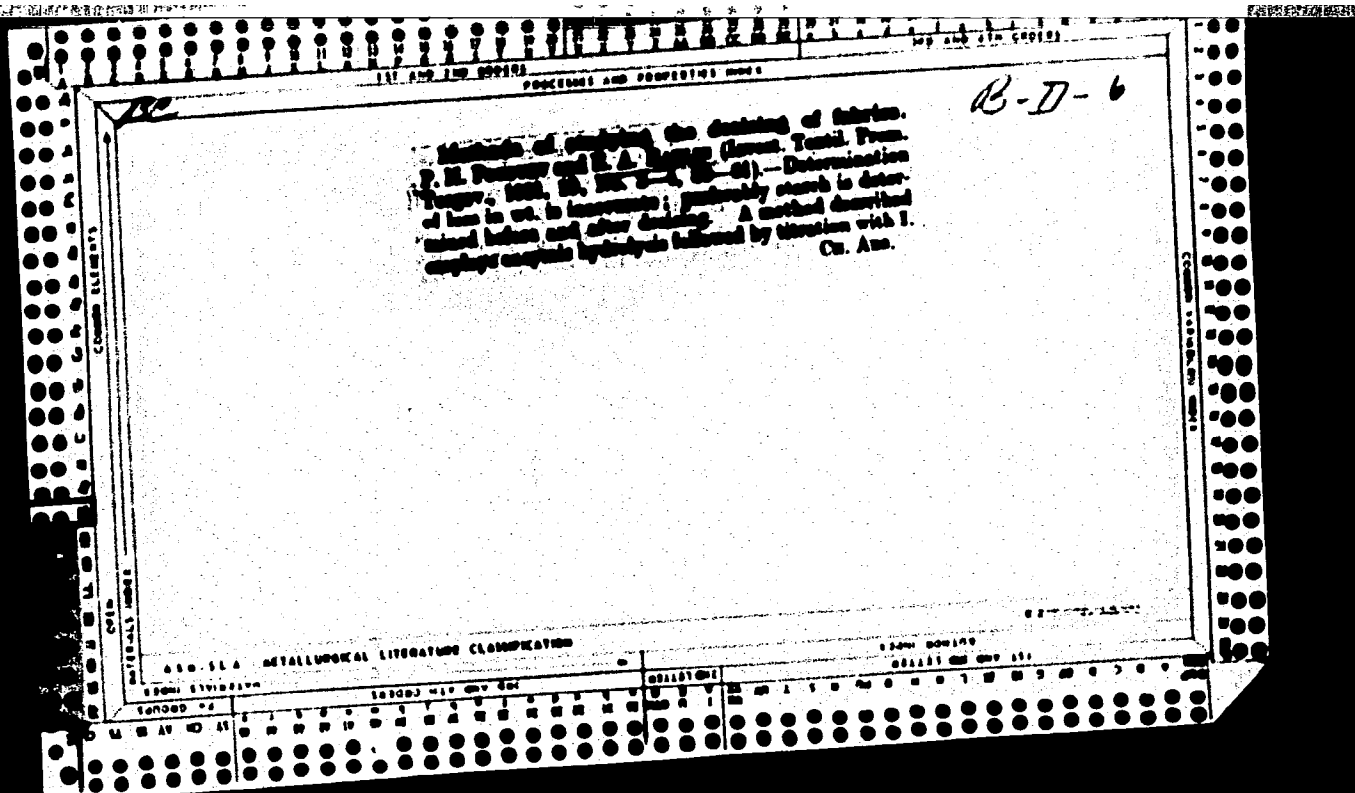khoziaistvo" no.8, 1960. Reviewed by IU. F. Atlashkin, V.P.
Rakk, I.M. Barsuk. Neft. khoz. 39 no.3:63-65 Mr '61.
                                          (MIRA 16:7)
         (Petroleum--Storage)   (Evaporation)
                (Dubiaga, A.G.)

RAKK, V.P.

Operation of service stations. Neftianik 6 no.8:18 Ag '61.
(MIRA 14:10)

1. Nachal'nik Kazanskogo upravleniya Glavneftesbyta RSFSR.
(Service stations)

Methods of studying the desizing of fabrics. P. M. POGOYEV AND E. A. KAELIN. *Izvestiya Tekstil. Prom. Torgo.* 10, Nos. 3-4, 80-1(1931); *Chimie & Industrie* 27, 909.—The usual method of detg. the degree of desizing consists in detg. the loss in wt. of the fabric on desizing. This method is inaccurate because the desizing treatment removes not only sizing materials but also a certain amt. of impurities and part of the degraded fibers. It is preferable to det. starch before and after desizing, and the following method is recommended: immerse 2 g. fabric for 5 min. in hot water, cool to 60°, add 20 cc. of 10% bialase soln., let stand till no starch reaction is obtained on testing with I, remove the fabric and wash with hot water, to the combined soln. and washings add 10 cc. concd. HCl, heat on the boiling water bath for 3 hrs. under a reflux condenser, cool, neutralize to litmus with NaOH, make to 500 cc., to a 50-cc. aliquot, add 20 cc. 0.02 N I and 50 cc. of a 1:1 mixt. of Na$_2$CO$_3$ (42.4 g. per l.) and NaHCO$_3$ (33.6 g. per l.), let stand in the dark for 1.5-2 hrs., acidify with 12.5 cc. of 25% H$_2$SO$_4$ and titrate the excess I with 0.01 N Na$_2$S$_2$O$_3$. One cc. 0.01 N I = 0.0048 g. glucose, or 0.0084 g. starch.   A. P. C.

YUGOSLAVIA/Farm Animals - Cattle.   C-2

Abs Jour   : Ref Zhur - Biol., No 1, 1959, 3034

Author   : Smalcelj, I., Rako, A., Jelicic, I.
Inst   : -
Title   : Evolutionary Trends in the Breed Structure of Cattle in
               Istra.

Orig Pub   : Stocarstvo, 1958, 12, No 1-2, 1-15.

Abstract   : The total of cattle in that region amounts to 44,285 heads,
               in which the young stock accounts for 41% (calves up to 1
               year old - 18%), steers 20%, and bulls 5%. Istrian cattle
               are characterized by: height at withers - 125-135 cm and
               more; chest depth - 51% of height at withers; trunk
               length - approximately 116-113% of height at withers. The
               live weight of cows is 450-500 kg, of bulls approximately
               900 kg, and of steers up to 1,100 kg. The slaughter weight
               of steers reaches 55% of their live weight. This is a

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Card 2/2

COUNTRY   : YUGOSLAVIA
CATEGORY   : Farm Animals. Cattle

ABS. JOUR.   : RZBiol., No. 13, 1958, No. 59515

AUTHOR   : Rako, A.
INST.   : -
TITLE   : Improvement of the Local Simmenthal Cattle
               and Artificial Insemination

ORIG. PUB.   : Veterin. glasnik, 1957, 11, No 1, 14-26

ABSTRACT   : No abstract.

CARD: 1/1

Q - 26

YUGOSLAVIA

RAKO, A; DUKANOVSKY, F; FINDRIK, M; JAKOVAC, K.

Institute of Zootechnics and Hygiene of the Veterinarian
Faculty of the University (Institut za zootehniku i
higijenu Veterinarskog fakulteta Sveucilista), Zagreb
(for all)

Zagreb, Veterinarski arhiv, No 7-8, 1963, pp 213-216

"The Effect of Nutrition and Milk Production on Some
Minerals, Ferments and Proteins in the Serum of Cows."

RAKO, A.

Practical application of stellestrol for promotion of ractation in goats

The influence of some climatic factors on the lactation of cattle during summer Tinae

Stocarstvo 6:18-23 Jan. 1952
Vet Arh 23: 148-158 1953

RAKO, Dr. Ante

"Asst. prof. & director of the Inst. for animal Husbandry, Vet. Faculty, U. of
Zagreb." co-au MARINIC, I. Inst. for Animal Husbandry & HRANIDBUDOMACIH ZIVOTINJA,
Vet. Fac. Univ. of Zagreb.

Vet. BROJ 8, 9, 10   1952
Vet. Archiv. 23 : 148-158, 1953

RAKO, Dr. Ante

"Hormonal Castration of Sows by means of Hilbestrol." Dr. Ante Rako - professor, at Vet.
Faculty of the Zagreb Univ. Mirko Findrik - vet. - assistant at Vet. Faculty of
Zagreb Univ.

SOURCE: Veterinaria, STEZAK 4, p. 618, 1953

BLAZHKEVICH, B.I.; VERKHOVTSEV, V.S.; VOROBKEVICH, V.Yu.; RAKO, M.A.;
     SINITSKIY, L.A.; SMIRNOV, N.I.; SHKOL'NYY, V.A.

Magnetic semiconductor millivoltmeter for measuring the
electromotive force of thermocouples. Avtom.kont. i izm.
tekh. no.5:142-148 '61.   (MIRA 14:11)
                    (Millivoltmeter)

IVANOVSKAYA, L.A.; KULIKOV, G.V.; RAKOBOL'SKAYA, I.V.; SARYCHEVA, L.I.

Cloud chamber investigation of the electron-photon components of extensive air showers at sea level [with summary in English].
Zhur.eksper. i teor.fiz. 33 no.2:358-364 Ag '57.   MIRA 10:10)

1.Fizicheskiy institut imeni P.N. Lebedeva AN SSSR i Moskovskiy gosudarstvennyy universitet.
            (Cosmic rays)   (Cloud chamber)

28927
S/056/61/041/004/011/019
B113/B112

3.2410

AUTHOR: Rakobol'skaya, I. V.

TITLE: Calculation of the fraction of high-energy electrons and
photons near the axis of a broad atmospheric shower

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 4(10), 1961, 1125 - 1129

TEXT: The fraction of high-energy electrons and photons of an extensive
atmospheric shower which are recorded at distances of up to 3 meters from
the shower axis is calculated on the assumption that π^0-mesons are generated
continuously throughout the atmosphere. The angles of emission of π^0-mesons
are taken into account. It was assumed that pions were formed in the
shower center, and that the transverse momentum obtained by a π^0-meson was
constant and equal to $p_\perp = 4 \cdot 10^8$ ev/c. The angle through which the π^0-meson
is deflected from the shower axis is equal to $\Theta = p_\perp c/E_0$. The electron
and photon number $N(t_0, R, E)$ at an atmospheric depth t_0 in a circle (of

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Calculation of the fraction of...

the radius R) around the shower axis in a shower of the total energy E' is

equal to: $N(t_0, R, E) = \int_0^{t_0} \int_0^{E'} \Phi(E_0, t)F(E_0, E, R, t_0 - t)dE_0 dt.$

$F(E_0, E, R, t_0-t)$ is a function giving the number of electrons and photons of an energy $\geqslant E$ which reach the depth t_0 in a circle of the radius R around a photon of the energy E_0 formed at the depth t and deflected through θ from the shower axis. $\Phi(E_0, t)$ is the number of photons of the energy E_0 formed at the depth t in π^0-meson decay.   Table 2

$1/\mu$, g/cm^2	E_0, ev				
	$7 \cdot 10^{10}$	$2 \cdot 10^{11}$	$5,5 \cdot 10^{11}$	$1,5 \cdot 10^{12}$	$4 \cdot 10^{12}$
180	5	47	59	64	70
160	4	40	53	60	66
120	3,5	31	38	45	
70	1,7	9	17	25	

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gives calculated values of the fraction Δ of high-energy electrons and photons with respect to all electrons in a circle of 0 - 3 m as dependent on the initial energy E_0 of the photon and of a coefficient μ, which is defined by the $e^{-\mu t}$ dependence of photon generation. Following this, the author studied what the spectrum $\Phi(E_0,t)$ of the photons should look like to make the theoretical values of Δ agree with the experimental values for $1/\mu = 160$ g/cm^2. The spectrum was taken in the form $\Phi(E_0,t) = AE^{-\gamma}$, and the following possibilities were considered: (1) For $\gamma = 2.0$ in the energy range $10^9 - 2\cdot10^{12}$ ev, $\Delta = 19\%$. (2) For $\gamma = 1.5$ in the energy range $10^9 - 10^{11}$ ev and $\gamma = 2.5$ in the range $2\cdot10^{11} - 2\cdot10^{12}$ ev, $\Delta = 20\%$. (3) If $\gamma = 1.3$ and the photon spectrum is cut off at $2\cdot10^{12}$ ev, $\Delta = 43\%$. The investigations showed that the theoretical and experimental values for Δ may agree if, without consideration of the angle of π^0-meson emission, it is assumed that the energy spectrum of the generated photons is much softer than the spectrum of the nuclear-active component in the shower at

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Calculation of the fraction of...   B113/B112

energies $> 10^{11} - 10^{12}$ ev. Finally, the author thanks Professor G. T.
Zatsepin for continuous attention and valuable advice, S. I. Nikol'skiy
and L. I. Sarycheva for discussing the results obtained, and V. V.
Guzhavin for supplying several data (Ref. 9: V. V. Guzhavin, G. T.
Zatsepin, ZhETF, 32, 365, 1957). L. D. Landau (Izv. AN SSSR, ser. fiz.
17, 51, 1953) is mentioned. There are 1 figure, 3 tables, and 12
references: 11 Soviet and 1 non-Soviet. The reference to the English-
language publication reads as follows: W. E. Hazen, R. W. Williams, C. A.
Randall. Phys. Rev., 93, 578, 1954.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo
              universiteta (Institute of Nuclear Physics of the Moscow
              State University)

SUBMITTED: March 6, 1961

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31528
S/627/60/002/000/010/027
D299/D304

3, 24/0 (1559, 2205, 2805)

AUTHORS: Dovzhenko, O. I., Nikols'kiy, S. I., and Rakobol'skaya,
I. V.

TITLE: Study of electron-photon component of extensive air
showers near the shower axis

SOURCE: International Conference on Cosmic Radiation. Moscow,
1959. Trudy. v. 2. Shirokiye atmosfernyye livni i kas-
kadnyye protsessy, 132-138

TEXT: The electron-photon component was investigated by a cloud
chamber containing lead plates; thereby, cascade showers were cre-
ated by the electrons and photons on passage through the chamber.
In contradistinction to other investigations, the energy of the
electrons and photons was not determined by the overall sum of par-
ticles in the entire cascade shower, but by the number of particles
in the upper 5 sections of the chamber, in the region of the shower
maximum. The present investigation was carried out in the fall of
1955 at an altitude of 3860 m (at Pamir Mountain), and during 1957-

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D299/D304

Study of electron-photon ...

1958 at sea level (at Moscow). Two different methods of shower se-
lection were used. In 70% of the cases the axes of the extensive
air showers passed at a distance of 0 to 3 m from the cloud cham-
ber. The total number of particles was determined by means of a ho-
doscope. In the Pamir investigations, 300 showers were recorded
with number of particles per shower $\bar{N} = 10^5$. At Moscow, 2370 show-
ers with $\bar{N} = 8 \cdot 10^3$ were registered. 1830 showers with $\bar{N} = 1.2 \cdot 10^4$,
and 436 showers with $\bar{N} = 3 \cdot 10^4$. As a result of the experiments, the
integral energy-spectra of the electron-photon component were ob-
tained. From these spectra, the fraction of high-energy electrons
and photons (with respect to the total number of particles in a
shower) was determined. The results obtained for showers of various
number of particles agree with each other within the limits of ex-
perimental error. No increase was observed in the high-energy ele-
ctron and photon fraction with increasing number of particles. A
comparison of experimental results with the predictions of cascade
shower theory showed that the experimental spectra in the vicinity

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Study of electron-photon ...

of the shower axis, are deficient in high-energy electrons. Subsequently, the energy spectra of electrons were computed for showers in which the electron-photon component is in equilibrium with the nuclearactive component. The integral energy spectrum was constructed for distances of 0 to 3 m. from the shower axis. A considerable discrepancy was found between the theoretical and experimental curves. This may be due to the fact that the theoretical calculations did not properly take into account the initial conditions of creation and development of the electron-photon component. Further, the lateral distribution of high-energy electrons and photons in the core region was found (at distances of 0 to 0.3 m from the shower axis). If certain conditions were simultaneously fulfilled, then the core was considered to pass through the cloud chamber. For electrons and photons with energies $> 10^9$ ev., the density distribution of the particles can be expressed by $\rho(> 10^9) \sim r^{-n}$, where $n = 1.2 + 0.3$. From data obtained at the Pamir Mountain, it follows that $n = 1.6 + 0.3$ at distances of 1 to 7 m. A figure shows the distribution of electrons and photons, obtained at Moscow and the

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Pamir Mountain, respectively. The energy spectra of electrons and photons were constructed on the basis of 12 cases when the core passed through the chamber (for distances of 0 to 0.3 m from the axis). The mean energy per charged particle in the region of the axis was approximately $3 \cdot 10^9$ ev., and at 0.3 to 3 m from the axis - approx. $4 \cdot 10^8$ ev. The obtained values for the mean energy and the mean density are in good agreement with the results of T. Kameda et al. (Ref. 7: This Trudy, p. 56). There are 2 figures, 1 table and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc (including one translation). The reference to the English-language publication reads as follows: W. Hazen. Phys. Rev., 85, 455, 1952.

Card 4/4

AUTHORS: Dovzhenko, O. I., Kozhevnikov, O. A.   SOV/56-34-6-37/51
Nikol'skiy, S. I., Rakobol'skaya, I. V.

TITLE: The Energy Spectrum of the Nuclear-Active Particles in the
Extensive Air Showers (Energeticheskiy spektr yaderno-aktiv-
nykh chastits v shirokikh atmosfernykh livnyakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
Vol. 34, Nr 6, pp. 1637-1639 (USSR)

ABSTRACT: As a supplement of their previous paper (Ref 1) the authors
investigated (at an altitude of 3860 m) the above mentioned
energy spectrum. The nuclear-active particles were separated
from the total particle flow in the extensive air shower ac-
cording to the generation of an electron nuclear shower in
lead plates which were located within a great rectangular
cloud chamber. The total thickness of the lead plates was
~100 g/cm^2. A criterion is given for the separation of the
cases with electron-nuclear showers from the cases with elec-
tromagnetic showers. The experiments were carried out in
2 different ways. In the first one there was no absorber
above the cloud chamber, but in the second way - ~100 g/cm^2 Al.
A sketch of the experimental apparatus is given, it registrat-

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307/56-34-6-37/51

The Energy Spectrum of the Nuclear-Active Particles in the Extensive Air
Showers

ed the extensive air showers with total particle numbers from 10^4 to 10^6. As a result of the measurements carried out for 52 nuclear interactions the authors obtained the integral energy spectra of the nuclear-active particles in the energy interval 2 - 50 BeV for distances from 0 - 9 m from the axis of the extensive air shower. As the form of the energy spectrum was identical for both of the above-mentioned experimental variants their results were averaged. The integral energy spectrum of the nuclear-active particles obtained for the energy region 10 - 50 BeV may be approximated by an exponential function of the type E^{-k} with $k = 0,95 \pm 0,25$. By comparison of the observed number of the nuclear-active particles with the density of the electron flow in the showers recorded by the authors' apparatus, it was possible to estimate the share of the nuclear-active particles with > 2 BeV in the total flow of the charged particles in the extensive air showers located within distances of 0 - 9 m from the axis. This share amounts to $(1,3 \pm 0,3)$ %, which is in good agreement with previous results obtained by means of a hodoscopic detector. There are 2 figures and 6 references, 6 of which are Soviet.

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SOV/56-34-6-37/51

The Energy Spectrum of the Nuclear-Active Particles in the Extensive Air Showers

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
(Physics Institute imeni P. N. Lebedev, AS USSR)

SUBMITTED: February 26, 1958

Card 3/3

SOV/56-34-3-2/55

AUTHORS: Danilova, T. V., Dovzhenko, O. I.,
Nikol'skiy, S. I., Rakobol'skaya, I. V.

TITLE: Cloud Chamber Investigation of the Electron-Photon
Component of Extensive Atmospheric Showers Near the Axis
of the shower at an altitude of 3860 m by Means of Vil'son Camera
(Issledovaniye elektronno-fotonnoy komponenty shirokikh
atmosfernykh livney vblizi osi livnya na vysote 3860 m s
pomoshch'yu kamery Vil'sona)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958,
Vol. 34, Nr 3, pp. 541-547 (USSR)

ABSTRACT: The present work is a continuation of a paper by I. A.
Ivanovskaya and others (Ref 1), and it investigates the
energy spectra of the electron-photon component in extensive
atmospheric showers. The measurements were carried out on the
Pamir by means of a rectangular cloud-chamber and with 1000
counters (connected to a hodoscopic device) in autumn 1955.
Seven lead plates of different thickness were mounted within
this cloud chamber. The cases of passage of an extensive
atmospheric shower were separated by means of a system of

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SOV/56-34-3-2/55

Cloud Chamber Investigation of the Electron-Photon Component
of Extensive Atmospheric Showers Near the Axis of the Shower at an Altitude
of 3860 m by Means of Vil'son Camera

coincidence and anticoincidence pulses in some groups of
counters. The registered distribution of the showers on the
number of particles is shown in a diagram. The position of
the shower axis and the total number of particles within
the shower were determined from the spatial distribution of
the charged particles. The energy of the electrons and
photons which caused the shower in the lead plates inside
the chamber was determined by means of the comparison of the
total number of particles within the shower with the number
of particles computed from the cascade curves for lead. In
order to compare the experimental results with the
predictions of electromagnetic cascade theory the authors
computed the integral energy spectra of the electrons. The
results of these spectra coincide with one another in the
case of an energy of 10^9 eV for the distances of from 2 to
4 m from the axis. These and also other mentioned
experimental results make possible the following final
conclusions: Near the axis of an extensive atmospheric shower
deficiency of electrons and photons with high energies is

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SOV/56-34-3-2/55

Cloud Chamber Investigation of the Electron-Photon Component
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Altitude of 3860 m by Means of Vil'son Camera

observed. This obviously is connected with a flow of photons
of low energy near the axis as well as with the fact that in
the production of the electron-photon component of the shower
nuclear-active particles with an energy of from $10^{10}-10^{12}$ eV
play a part. The spectrum of the electron-photon component in
extensive atmospheric showers caused by primary particles with
an energy of $\leqslant 2.10^{14}$ eV remains unchanged with a change of
the observational altitude. This can be explained by the
equilibrium of the electronphoton component of extensive
atmospheric showers with nuclear-active particles of high energy
as well as by the predominant registration of extensive
atmospheric showers (which formed at a certain absolute
altitude above the observation level in the depth of the
atmosphere).
There are 8 figures, 3 tables, and 8 references, 6 of which are
Soviet

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SOV/56-34-3-2/55

Cloud Chamber Investigation of the Electron-Photon Component
of Extensive Atmospheric Showers Near the Axis of the Shower at an
Altitude of 3860 m by Means of Vil'son Camera

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
                (Physical Institute imeni P. N. Lebedev AS USSR)

SUBMITTED: July 16, 1957

Card 4/4

RAKOBOL'SKAYA, I. V.

Dissertation defended for the degree of Candidate of Physicomathematical Sciences at the Physics Institute imeni P. N. Lebedev in 1962:

"Investigation of the Energy Characteristics of the Energy Characteristics of the Electron-Photon Component of Extended Atmospheric Showers Near the Shower Axis."

Vest. Akad. Nauk SSSR.   No. 4, Moscow, 1963, pages 119-145

307/56-35-6-43/44

21(8)
AUTHORS: Ivanovskaya, I. A., Rakobol'skaya, I. V.

TITLE: On the Problem of the Spectrum of the Electron-Photon Component
             of Extensive Atmospheric Showers (K voprosu o spektre
             elektronno-fotonnoy komponenty shirokikh atmosfernykh livney)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
             Vol 35, Nr 6, pp 1583-1584 (USSR)

ABSTRACT: The present work was carried out in Moscow in 1958 for the pur-
             pose of clearing up the difference between the results obtained
             by the authors of 2 previous papers (Refs 1,2). The energy
             spectra obtained by these works differed from one another in the
             energy range of $< 10^9$. Besides, the two earlier papers gave
             different values of the share $\varphi(\geqslant 10^9)/\varphi(>0)$ of high-energy
             electrons and photons. For the purpose of solving this problem
             new experiments were carried out on sea-level by means of the
             same cloud chamber as before. The already described control
             system made it possible to select extensive atmospheric showers,
             the axis of which in 70% of the cases passed the chamber at a
             distance of from 0 to 3 m. The average number of particles in
             these showers was 3.10^4. After measurements of 400 hours dura-

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SOV/56-35-6-43/44

On the Problem of the Spectrum of the Electron-Photon Component of Extensive
Atmospheric Showers

tion, 385 showers were determined. The energy spectrum of the
electron-photon component found by these measurements is shown
by a diagram. The spectrum found by this work differs from the
results obtained by the aforementioned previous work (Ref 1).
After careful analysis and comparison of previous and new ex-
perimental data, the authors formed the following opinion con-
cerning the causes of the aforementioned differences: 1) In the
interval of from 0 to 3 m the axis of the showers recorded by
the earlier (Ref 1) and by the present work were differently
distributed over the distances from the cloud chamber. 2) In
the earlier work only few showers were recorded in a distance of
less than 1 m from the chamber, which was apt to lead to con-
siderable fluctuations with respect to their share. 3) Because
of the small number of counters in the hodoscope used in the
earlier work, distances from the shower axis and the cloud
chamber were determined with insufficient accuracy, so that a
certain part of the showers of greater distances was assumed to
belong to the interval of from 0 to 3 m. An exact analysis of
Card 2/3   these causes will be published later. The assumption made

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On the Problem of the Spectrum of the Electron-Photon Component of Extensive Atmospheric Showers

earlier regarding the high degree of dependence of the share of high-energy electrons and photons on the number of particles in the shower was not confirmed. The authors thank G. T. Zatsepin, S. I. Nikol'skiy, L. I. Sarycheva, and O. I. Dovzhenko for discussing the results obtained. There are 1 figure and 4 Soviet references.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
               (Physics Institute imeni P. N. Lebedev of the Academy of
               Sciences, USSR)

SUBMITTED: June 27, 1958

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IVANOVSKAYA, I.A.; RAKOBOL'SKAYA, I.V.

Spectum of the electron and photon components of H extensive
air showers. Zhur. eksp. i teor. fiz. 35 no.6:1583-1584 D '58.
(MIRA 12:3)

1.Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
(Cosmic rays)

AUTHORS: Dovzhenko, O. , Zatsepin, V. , Murzina, Ye. , Rakobol'skaya, I.V, Tukish, Ye.

TITLE: Investigation of Extensive Atmospheric Showers of Cosmic Radiation (Issledovaniye shirokikh atmosfernykh livney kos- micheskogo izlucheniya)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 118, Nr 5, pp.899-902 (USSR)

ABSTRACT: In autumn 1955 the energetic characteristics of extensive at- mospheric showers were investigated at an altitude of 3860 m above the sea level. The lay-out of the experimental equipment is illustrated in a diagram. Extensive atmospheric showers caused by primary particles with an energy of from $2.10^{13}-10^{16}$ eV were separated by fourfold discharges in two groups of counters (with a mutual distance of two meters). A number of about 4.10^4 extensive atmospheric showers were recorded. A great number of counters was employed in these measurements. The energy spectrum of the myons at a distance

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20-118-5-14/ 59

Investigation of Extensive Atmospheric Showers of Cosmic Radiation

from the shower axis not exceeding 10 m can be expressed in the form $\sim 1/E^m$ in the energy interval of the myons of from E = 1,5 - 3,5 BeV. Here holds m = 0,27 ± 0,06. The authors report on the observations of the passage of shower cores through a detector for penetrating particles which was mounted at a depth of a water equivalent of 800 g/cm^2. The computed shower rate caused by primary particles with an energy of $E_0 < 6.10^{14}$ eV completely agrees with the observed rate, whereas the observed shower rate caused by primary particles with $E > 6.10^{14}$ eV is several times as high as the expected rate. The spectrum of the electron-photon component in the core parts of the here observed atmospheric showers was investigated by means of a great cloud chamber, that is to say for energies of from $2.10^8 - 10^{10}$ eV at a varying distance from the shower axis. The experimentally determined spectra of the electron-photon component at distances up to 4 m from the shower axis showed a decrease of electrons and photons with high energies , contratry to predictions of cascade theory. This only holds, if the energy of the neutral pions responsible for the generation of the electron-photon component is set equal to 10^{12} eV. This contradiction between experiment and theory can be removed, if an essential in-

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fluence of the neutral pions with energies above 10^{10} eV on the electron-photon component of the shower is assumed. Filters of various thickness of different materials were mounted above the ionization chambers. This permitted to measure the energy flow, which is carried by the electron-photon component of the shower at various distances from the shower axis and also the determination of the energy of the nuclear-active shower particles. The energy of the particle with the highest energy in the core of the extensive atmospheric showers with less than 10^5 particles amounts to 10 % in the mean of the energy of the electron-photon component of the shower at the observation altitude. The remaining nuclear-active particles in the shower are distributed according to the law $\sim 1/E^n$, E denoting the energy of the nuclear active particles and n = 0,9 ± 0,2 holding. The cores of the extensive atmospheric showers with a number of particles exceeding 10^{15} are very complicated. There are 3 figures, and 6 references, 6 of which are Soviet.

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20-118-5-14/59

Investigation of Extensive Atmospheric Showers of Cosmic Radiation

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
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PRESENTED: August 29, 1957, by D. V. Skobel'tsyn, Member, Academy of
              Sciences, USSR

SUBMITTED: July 22, 1957

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DOVZHENKO, O.I.; NIKOL'SKIY, S.I.; RAKOBOL'SKAYA, I.V.

Wilson cloud chamber investigation of cores of extensive cosmic
ray showers [with summary in English]. Zhur.eksp. i teor.fiz. 36
no.1:17-23 Ja '59.   (MIRA 12:2)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
       (Cosmic rays)   (Cloud chambers)

24(5)
AUTHORS: Dovzhenko, O. I., Nikol'skiy, S. I.,   SOV/56-36-1-3/62
Rakobol'skaya, I. V.

TITLE: Investigation of the Cores of Broad Atmospheric Showers of
Cosmic Rays by Means of a Cloud Chamber (Issledovaniye stvolov
shirokikh atmosfernykh livney kosmicheskikh luchey pri
pomoshchi kamery Vil'sona)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
Vol 36, Nr 1, pp 17-23 (USSR)

ABSTRACT: In the present paper investigations are described which were
carried out (on sea level) in Moscow in 1957. Interest in
investigations of extensive air showers increased considerably
recently, because the investigation of structure, composition,
energy distribution of particles as well as the Cherenkov
radiation produced in the atmosphere can supply information
concerning particles interaction at energies $> 10^{13}$ eV. In
this connection especially the investigation of shower cores
is of importance, which also forms the subject of the present
paper.
For the investigation a rectangular cloud chamber and coun-
ters were used. The arrangement was such that such cases of

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shower passages were selected for measurements, in which the
flux of shower particles above the cloud chamber was greater
than that recorded by more distant counter groups (Fig 1).
The device is then described. Furthermore, the differential
shower spectrum is calculated according to the number of
particles on the basis of the following assumptions: 1) The
shower particles are symmetrically distributed round the
shower axis in form of a circle. 2) The differential distri-
bution spectrum is assumed to have the form:

$f(N)dN \sim N^{-(\gamma+1)}dN$, where $\mu(N)$ is taken from reference 3.
3) The number of shower axes with particle numbers $N > 10^5$
amounts to $7.10^{-3}/m^2$ per hour (Ref 3). 4) The probability
distribution of particle recording is assumed to correspond
to the Poisson (Puasson) law. Calculation results are shown
by figure 3.
Also the number of showers recorded per hour and the mean
value of the density of charged particles was calculated, and
calculated and experimental values are compared (Table 2).
Agreement is good. Further, the number of shower cores of the

Card 2/4   electron-photon components for $N < 3.5.10^4$ and $N > 3.5.10^4$ are

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calculated. In the former case, calculation results in ~ 10,
and the experimental result is 9; in the latter case the cal-
culated result is ~ 3, the experimental result 2. For the
number of nuclear-active particles with energies of $\gtrsim 10^{11}$ ev
5 and 1-2 was calculated, while the experimental value was 4
and 0 respectively for the two N-values. 4 photographs are
attached: Figure 4 shows a cloud chamber photograph of a
penetrating electron-photon shower with $N \approx 10^4$, figure 5 a
nuclear interaction at an energy of nuclear active particles
of $> 10^{11}$ ev and $N = 3.3.10^4$; figure 6 also shows a nuclear
interaction caused by charged particles in the first plate
of the chamber, at an energy of nuclear active particles of
$\gtrsim 2.10^{11}$ ev and $N = 2.5.10^4$, and figure 8 shows a nuclear
interaction at an energy of $< 10^{10}$ ev. The authors finally
thank N. A. Dobrotin, Professor, and G. T. Zatsepin for their
interest, N. G. Birger and D. S. Chernavskiy for discussing the

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results, and O. A. Kozhevnikov, A. M. Mozhayev, B. V. Subbotin,
and Ye. N. Tarasov for helping to carry out measurements.
There are 7 figures, 3 tables, and 7 references, 4 of which
are Soviet.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
                 (Physics Institute imeni P. N. Lebedev of the Academy of
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SUBMITTED: June 14, 1958

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DOVZHENKO, O.I.; NIKOL'SKIY, S.I.; RAKOBOL'SKAYA, I.V.

Energy spectra of the electron-photon component in broad atmospheric showers near the shower axis. Zhur.eksp.i teor.fiz. 38 no.5: 1361-1369 My '60.   (MIRA 13:7)

1. Fizicheskiy institut im. P.N.Lebedeva Akademii nauk SSSR.
   (Cosmic rays)   (Cloud chamber)

DANILOVA, T.V.; DOVZHENKO, O.I.; NIKOL'SKIY, S.I.; RAKOBOL'SKAYA, I.V.

Cloud chamber investigation of the electron-photon component
of extensive atmospheric showers near the axis at an altitude
of 3860 m above sea level. Zhur.eksp. i teor. fiz. 34 no.3:541-547
Mr '58.   (MIRA 11:4)

1.Fizicheskiy institut im. P.N. Lebedeva Akademii nauk SSSR.
                    (Cloud chamber) (Cosmic rays)

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56-2-8/47

AUTHOR   IVANOVSKAYA, I.A., KULIKOV, G.V., RAKOBOLSKAYA, I.V. SARYCHEVA, L.I.
TITLE   Cloud Chamber Investigation of the Electron-Photon Component of Extensive Air Showers at Sea Level
            (Issledovaniye elektronno-fotonnoy komponenty shirokikh atmosfernykh livney na urovne morya pri pomoshchi kamery Vilsona. Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 2 (8), pp 355 – 364 (U.S.S.R.)

ABSTRACT   By means of a Wilson chamber located at sea level the energy spectrum of the electron-photon component of a broad atmospheric shower with different numbers of particles and different axis spacings was investigated. A dependence of energy spectra of the number of particles in broad showers was not observed. In a large distance from the shower axis the energy spectrum becomes "softer". The experimentally found share of high-energy electrons in different axial spacings cannot be brought into line with the number computed by means of the cascade theory.

For an axial spacing of 2 - lo m the spatial distribution of the energy flow, of the electron-photon component of the shower can be approximated by the law r^{-n}, $n = 2,0 + 0,5$.

Card 1/2   (With 2 tables, 5 illustrations, and 3 Slavic references).

56-2-8/47

Cloud Chamber Investigation of the Electron-Photon Component of
Extensive Air Showers at Sea Level

ASSOCIATION: Institute of Physics im. P.N. Lebedev of the Academy of Sciences
of the USSR and Moscow State University (Fizicheskiy institut
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universitet)

PRESENTED BY:
SUBMITTED: 11.3.1957
AVAILABLE: Library of Congress

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S/056/60/038/005/001/050

B006/B070

24.6900

AUTHORS: Dovzhenko, O. I., Nikol'skiy, S. I., Rakobol'skaya, I. V.

TITLE: The Energy Spectra of the Electron - Photon Component of
Air Showers in the Neighborhood of the Shower Axis

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 5, pp. 1361-1369

TEXT: The results given in publications on this topic are inexact and
contradictory. The authors have therefore investigated the electron -
photon energy spectrum within 3 m of the shower axis. The method of measure-
ment and the experimental arrangement are described in detail. Fig. 1 shows
the arrangement of the cloud chamber in which six lead plates of different
thicknesses (total: 120 g/cm^2) are placed over one another along with the
surrounding counters for the two control systems. Only showers with low
particle-flux densities ($\bar{N} = 9 \cdot 10^3$, $1.2 \cdot 10^4$, and $3 \cdot 10^4$) were selected for
study. Of these, 2370, 1830, and 436 showers, respectively, were recorded.
Nearly 70% of all particles lay within the chosen radius of 3 m. The
spatial distribution of the charged particles in the showers with

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of the Shower Axis

$\bar{N} = 5 \cdot 10^3$ is shown in Fig. 3; this may be represented by $\rho(> 0) \sim r^{-n}$
with $n = 1.0 \pm 0.1$. Fig. 4 shows the integral electron-photon spectrum of
all three shower groups; Fig. 5 shows the ratio between the electron- and
the photon flux densities in the showers with $\bar{N} = 3 \cdot 10^4$ and $\bar{N} = 1.2 \cdot 10^4$.

The ratio $\Delta = \rho(\geq 10^9)/\rho(> 0)$ between the three shower groups was calculat-
ed to be 16 ± 4, 15 ± 3, and 13 ± 3, respectively. The data of the present work
are compared with those of Refs. 2-4 in Table 1. Numerical data referring
to the radial distribution of the particles are given in Table 2. Fig. 6
shows the integral distribution with respect to the number of electrons and
photons of each group with $E \geq 10^9$ ev. Experimental data are given as an
average over all showers along with those measured for 14 cases of shower
cores that passed through the cloud chamber. Poisson's distribution curves
are shown for both these distributions. The experimentally observed dis-
tribution does not agree with Poisson's. Fig. 7 shows the integral energy
spectrum of electrons and photons within 3 m of the shower axis. Fig. 8
shows the spatial distributions of electrons and photons having energies
$\geq 10^9$ ev for $r \leq 0.3$ m. For these high-energy particles, the distribution

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The Energy Spectra of the Electron - Photon   S/056/60/038/005/001/050
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law $\varrho(\geqslant 10^9) \sim r^{-n}$ holds, where n = 1.2+0.3. The results obtained are
compared with those of the cascade theory, for which purpose data of
S. Z. Belen'kiy and I. P. Ivanenko are used. The conclusions are summarized
as follows: 1) No change in the fraction of high-energy electrons and
photons could be observed in the showers with an increase in the total
number of particles. 2) The observed fraction of high-energy electrons and
photons is considerably smaller than the theoretical one; and this is so
whether the primary energy is assumed to be infinite, or an equilibrium
between the electron-photon and the nuclear active components is assumed.
G. T. Zatsepin, I. P. Ivanenko, and L. I. Sarycheva are thanked for dis-
cussions; and D. F. Rakitin, O. N. Novoselov, I. A. Ivanovskaya, B. M.
Mozhayev, and L. K. Bocharov for their assistance in the experiments.
There are 8 figures, 2 tables, and 8 references: 7 Soviet and 1 US.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR
                (Institute of Physics imeni P. N. Lebedev of the Academy
                of Sciences USSR)

SUBMITTED: December 18, 1959
Card 3/3

RAKOBOLSKAYA, I. V.

ENERGY SPECTRA OF THE ELECTRON-PHOTON COMPONENT IN EXTENSIVE AIR SHOWERS
NEAR THE SHOWER AXIS
S.I. Nikolsky, S.I. Dovzhenko, I.V. Rakobolskaya

1. The study was carried out in 1957-1958 at sea level with a cloud chamber
triggered by a system of counters.
2. The triggering counter system made it possible to select air showers, the
axes of which fell near the cloud chamber. In addition, during the study, the
system was altered so as to register most effectively showers with a given num-
ber of particles: $N = 8 \times 10^3$; $\bar{N} = 1.2 \times 10^4$; $\bar{N} = 3 \times 10^4$. The position of
the shower axis and the number of particles in it were determined from the
readings of the holoscope counters. A total of 4500 showers were registered.
3. The rectangular cloud chamber (60 x 60 cm) with a depth of 30 cm had 6
plates of lead making a total thickness of 120 g/cm^2. When an electron or
photon entered the chamber, a cascade shower was observed produced by these
particles in the lead sheets. The energy of the electrons and photons was
determined from the total number of particles registered between the lead
sheets in the cascade showers.
4. As a result of these measurements we have obtained the integral energy
spectra of a sum of electrons and photons for each of the shower groups; the
fraction of high-energy electrons and photons ($\gtrsim 10^9$ ev) in the total number